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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------|------------------|
| 10/681,509 | 10/07/2003 | James M. Cleaves | MA-108 | 9643 |
| 7590 07/07/2006 | | | | |
| Matrix Semiconductor, Inc. 3230 Scott Blvd. Santa Clara, CA 95054 | | | | |
| | | | EXAMINER WEISS, HOWARD | |
| | | | ART UNIT 2814 | PAPER NUMBER |

DATE MAILED: 07/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

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|------------------------------|-----------------|----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/681,509 | CLEEVES ET AL. | |
| | Examiner | Art Unit | |
| | Howard Weiss | 2814 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 9, 10, 15-29, 31, 33-42, 47-52 and 54-62 is/are pending in the application.
- 4a) Of the above claim(s) 1-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9, 10, 15-29, 31, 33-42, 47-52 and 54-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: MA-108

Filing Date: 10/7/2003

Continuing Data: none

Claimed Foreign Priority Date: none

Applicant(s): Cleeves et al. (Gu)

Examiner: Howard Weiss

Claim Objections

1. Claims 17 to 21 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 17 depends upon canceled Claim 8.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
 - (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. Claims 9, 10, 15 to 21, 31, 33 to 42, 47 to 52 and 62 are rejected under 35 U.S.C. § 103(a) as obvious over Lee et al. (U.S. Patent No. 6,881,994) and Voutsas (U.S. Patent No. 6,383,899).

Lee et al. show most aspects of the instant invention (e.g. Figures 35 to 65 and Column 30 Line 3 to Column 46 Line 47) including:

- forming a first amorphous silicon layer **4705**
- forming a mask layer **4722** and forming holes **4701** in a symmetric pattern

- selectively depositing a crystalline agent (e.g. Ge), crystallizing the regions using a laser and substantially removing the amorphous silicon (Column 32 Lines 17 to 33 and Column 46 Lines 13 to 47)
- forming a second amorphous silicon layer
- forming a monolithic three dimensional memory

Lee et al. do not show using silicon as the crystallizing agent. Voutsas teaches to use either silicon or germanium as crystallizing agents so as to not adversely affect the electronic properties of the silicon layer (Column 5 Lines 44 to 56). It would have been obvious to a person of ordinary skill in the art at the time of invention to use either silicon or germanium as crystallizing agents as taught by Voutsas in the process and device of Lee et al. so as to not adversely affect the electronic properties of the silicon layer.

4. Claims 22 to 29 and 54 to 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. and Voutsas, as applied to Claim 9 above, and further in view of Park et al. (U.S. Patent No. 6,727,514).

Lee et al. and Voutsas show most aspects of the instant invention (Paragraph 3) except for the area bounded by adjacent nucleation sites encloses no more than five crystal grain boundaries and the chance that the seeded area side is less than about one fourth of a distance between the nucleation sites has no more than one grain boundary is greater than about 0.75. Park et al. teach (e.g. Figures 1) to have the area bounded by adjacent nucleation sites encloses no more than five crystal grain boundaries and the chance that the seeded area side is less than about one fourth of a distance between the nucleation sites has no more than one grain boundary is greater than about 0.75 to provide an improved thin-film semiconductor device (Column 3 Lines 9 to 11). It would have been obvious to a person of ordinary skill in the art at the time of invention to have the area bounded by adjacent nucleation sites encloses no more than five crystal grain boundaries and the chance that the seeded

area side is less than about one fourth of a distance between the nucleation sites has no more than one grain boundary is greater than about 0.75 as taught by Park et al. in the process and device of Lee et al. and Voutsas to provide an improved thin-film semiconductor device.

Response to Arguments

5. Applicant's arguments filed 5/25/2006 have been fully considered but they are not persuasive. The Applicants state that Voutsas requires implantation of the silicon ions instead of deposition as in the claimed invention. However, Voutsas is used by the Examiner to teach the equivalence of Si and Ge as crystalline catalysts. Lee et al. teach to deposit the catalyst in contact with the amorphous Si layer (see Column 46 Lines 13 to 15) and to use laser to anneal the layer (Column 32 Lines 27 and 28) though these windows **4701**. Also the second amorphous layer is labeled as **SAC. aSi** (Figure 65).

In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

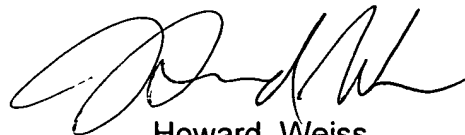
7. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via **Howard.Weiss@uspto.gov**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.
9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).

Art Unit: 2814

10. The following list is the Examiner's field of search for the present Office Action:

| Field of Search | Date |
|---|---------------|
| U.S. Class / Subclass(es): 257/66; 438/ 471, 473, 488, 489, 166, 417, 486, 482, 487, 969 | thru 7/3/2006 |
| Other Documentation: none | |
| Electronic Database(s): EAST | thru 7/3/2006 |

HW/hw
3 July 2006



Howard Weiss
Primary Examiner
Art Unit 2814